

Appendix H

Sonoma County Wineries:

Davis Bynum Winery and Benziger Family Winery

Pilot Study Report

California Environmental Protection Agency
Environmental Management System Project

1.0 Pilot Description

The EMS Winery Pilot Project involves two wineries in Sonoma County, Benziger Family Winery and Davis Bynum Winery. Both the grape growing and wine making operations are included in the pilot project.

The Benziger Family Winery is located on the East Side of Sonoma Mountain above the village of Glen Ellen, where it is bordered by Jack London State Park to the west. The Benziger Family has operated their winery and vineyards at this location since purchasing the 85-acre Sonoma Mountain Ranch in 1980. Sixty-five acres of vines are planted at the ranch. Another twenty-acre parcel is planted with vines in nearby Sonoma Valley. Grapes are also purchased from more than 60 growers. The Benziger Family Winery produces 180,000 cases of ultra-premium wine per year. The winery employs 49 people full time and 29 people are either part time or seasonal workers.

Davis Bynum Winery was founded in 1973 as the first winery on Westside Road in the Russian River Valley. The vineyards include 22 planted acres of California Certified Organic Farming (CCOF) vines. Davis Bynum is a family operated winery that annually crushes 250-275 tons of grapes to make approximately 15,000 cases of ultra-premium wine. The winery and vineyard is primarily operated by three members of the Bynum family and a head winemaker. Davis Bynum also purchases grapes from neighboring growers. Nine people are employed full time at the winery while three are regular part time employees.

Although there is significant range in size between these two wineries they are both considered medium sized based on industry standards. Small wineries produce less than 5,000 cases of wine per year. More than half the wineries in California are small wineries. Twenty-five wineries in California are considered commercial wineries, each producing over 500,000 cases per year.

Benziger and Davis Bynum wineries are still in the design and implementation phase of their EMSs. They have cooperatively developed their EMSs with the assistance of Cal/EPA. Work on their EMSs began in April 2000 and as of the date of this report they had developed environmental policies, significant aspects and set objectives and targets. They are still in the process of developing some

implementation programs; however, they have begun making progress towards some objectives and targets.

Pilot Project Management

Davis Bynum and Benziger Family Winery were selected as pilots in June 2000. The Cal/EPA project manager is Tom Lanphar, Senior Hazardous Substances Scientist for the Department of Toxic Substances Control. Both wineries worked cooperatively in the pilot project. Hampton Bynum, General Manager and Richard Wights, Systems Coordinator represents Davis Bynum Winery. Chris Benziger, Partner and National Sales Representative and Matt Atkinson, Ranch Manager represents Benziger Family Winery. Christine Kohl-Zaugg, a member of the EMS Northern California Working Group provided volunteer technical assistance to the project.

History of Environmental Management at the Wineries

Davis Bynum

Commitments to the environment and stewardship of the land are family values that are reflected in the business practices of the winery. The development of a formal Environmental Management System (EMS) follows many years of environmentally responsible farming and business practices. Davis Bynum sees the EMS as a logical next step for their environmental practices and a way to organize and align their business and environmental efforts.

Davis Bynum's history of environmental stewardship began with the establishment of their vineyard in 1983 when they began farming without pesticides or chemical fertilizers. This vineyard became certified under California Certified Organic Farming (CCOF) in 2000. Their environmental practices also extend to their winery. Davis Bynum Winery was one of two wineries (along with Benziger Family Winery) first certified by the Sonoma Green Business and Bay Area Green Business Programs. These programs are administered by Sonoma County Department of Emergency Services and are awarded only to companies demonstrating full environmental compliance and best practices in the areas of pollution prevention, resource conservation, and solid waste reduction. The Green Business certification applies only to the winery operations and not the vineyard.

In an effort to establish more diverse and sustainable agricultural systems, Davis Bynum has developed a three-acre Mediterranean Permaculture Food Forest. This is a multi-canopy, polyculture garden of trees, herbs, flowers, and vines which also includes ponds for raising fish, attracting insect-eating frogs, and growing water plants. According to Australian Bill Mollison, co-founder of the Permaculture concept, "Permaculture (permanent agriculture) is the conscious design and maintenance of agriculturally productive ecosystems which have the

diversity, stability, and resilience of natural ecosystems. It is the harmonious integration of landscape and people providing food, energy, shelter and other material and non-material needs in a sustainable way.”

A Permaculture Food Forest includes functional associations (or guilds) of plants, suited to the local environment. Each guild provides a specific function within the food forest and has a relationship with other guilds. For example, fruit trees establish the highest canopy in the forest and provide not only fruit, but shade for herbs growing within the lower canopies.

Davis Bynum Winery created the Permaculture Food Forest for several reasons. Design principles learned in the Food Forest may someday be applied to the vineyard to increase biodiversity, produce a more stable ecosystem, and increase productivity. The Food Forest plays a major role in pest control, attracting beneficial insects and directing harmful insects away from the vineyard. Produce, fish and chickens from the Food Forest will supply food for Davis Bynum’s summer luncheons held at the picnic area. The picnic area will also serve as a cultural and educational meeting place. Davis Bynum regularly hosts community and environmental groups at the Food Forest. Finally, excess produce can also be sold, thus diversifying their agriculturally-based business.

Davis Bynum Winery is now in the process of developing an ISO 14001 based Environmental Management System (EMS). According to Hampton Bynum, Vice-President, the EMS will further help them protect the environment and save money by instituting a knowledge-based strategic process for integrating environmental and social practices into the business function. Through the EMS, they hope to link their different activities (winemaking, resource use, waste generation, grape growing, Permaculture, and marketing) into a single operating system.

Benziger Family Winery

Another recognized leader in environmentally responsible wine making is Benziger Family Winery. Their environmental practices extend to both their vineyards and wineries. Developing an ISO 14001-based EMS is a continuation of a history of environmentally-based business practices. Like Davis Bynum, the EMS is seen as a logical next step in their business development and will serve to organize and connect the many practices already in place at Benziger Family Winery. The EMS will also drive future activities such as energy and fuel conservation.

At the root of the Benziger Family’s environmental stewardship is a goal to “produce world class wines that have a sense of place.” That is, wines that contain the unique personality and character of the place the grapes are grown. They plan to achieve their goal through farming in concert with nature and not in opposition to nature. According to Mike Benziger, President of Benziger Family

Winery, chemical pesticides and fertilizers reduce the unique and natural characteristics of a vineyard and its grapes. Restoring the biologic capital of a vineyard (the ability of nature to provide services such as pest control, fertilizing, and moisture retention) enhances the unique qualities of the wine. In order to accomplish their goal, Benziger has employed what they call Natural Farming Methods for several years.

Natural Farming Methods objectives are:

- Elimination or reduction of all vineyard chemicals.
- Elimination of chemical fertilizers.
- Restoration of balance and diversification to vineyard properties.

These objectives have been met through a combination of methods that work to enhance the biologic capital of the vineyard. By increasing habitat (insectaries and habitat corridors) for beneficial insects and vertebrates, synthetic pesticides are no longer used. Compost, developed by combining waste from the winery with manure from a local dairy, is spread over the vineyard increasing both soil fertility and vitality. The resulting increase in the diversity of soil organisms eliminates the need for soil fumigants. Soil water-holding capacity is also increased, reducing irrigation needs. Cover crops between vineyard rows serve to reduce soil erosion, fertilize soil through nitrogen fixation and attract beneficial insects. All these methods combine to allow deep root penetration and a connection of the vine to its local environment. All this results in quality grapes that reflect the characteristics of the location they are grown.

In order to achieve the natural conditions they seek in their vineyards, the Benziger Family practice Biodynamic farming. While similar to organic agriculture in that chemicals are eliminated Biodynamic farming goes further in responding to the earth's natural energies and cycles, and emphasizes a closed, self-contained ecosystem. In this way, it is similar to Permaculture. The Benziger Family's two Sonoma county vineyards were certified in 2000 by the Demeter Association, the international organization that monitors and approves Biodynamic practices.

Benziger buys the majority of their grapes from other growers. In order to improve quality, Benziger actively educates their growers in Natural Farming Methods. Through a yearly series of 'hot topic' seminars, growers learn the techniques, costs and benefits associated with Natural Farming Methods.

Environmental practices at Benziger also extend to the winery. In 1999, Benziger was one of two wineries (along with Davis Bynum Winery) first certified by the Sonoma Green and Bay Area Green Business Programs. The Green Business Program provides technical assistance to businesses in the areas of compliance, resource conservation and pollution prevention. The Program also certifies that a business is in full environmental compliance and meets the Green

Business standard for environmental practices in the areas of energy and water conservation, solid waste reduction and pollution prevention. As part of the Green Business certification process, Benziger demonstrated a 2,000,000-gallon per year water savings through recycling all wastewater generated by the winery. The wastewater is biologically treated in a series of ponds and wetlands and supplies 75 percent of their vineyard irrigation needs. Significant reductions in solid waste were also shown. Currently, 41 percent of the winery's waste stream is recycled.

Motivation

Both wineries are recognized as leaders in environmentally responsible practices, and have chosen to implement EMSs for several reasons. First, they see it as a logical next step in developing their environmental programs. They also hope to organize their environmental programs into a system to allow better understanding of their environmental responsibilities and more strategic planning for meeting those responsibilities. The potential cost savings and improvements in wine quality further motivate them. And they hope to use the EMS as an education tool for their employees and suppliers.

Cal/EPA proposed Davis Bynum and Benziger Family Wineries as pilot projects after receiving stakeholder suggestions to include agriculture in the EMS project. Wineries were considered because of their importance in California's economy, their environmental impacts, especially in the areas of water quality and availability, pesticide use, habitat loss and urban encroachment. Another consideration was the effort of many in the wine industry to become more environmentally responsible. Examples are the Sonoma Green Business Program for wineries, Fish Friendly Farming Program, and the Code of Sustainable Winegrowing Practices. The Green Business Program has already been described. Fish Friendly Farming is a voluntary certification program administered by the Sotoyome Resource Conservation District for grape growers who implement land management practices that restore and sustain fish habitat on their property. The Code of Sustainable Winegrowing Practices is set of voluntary statewide guidelines for sustainable farming and winemaking developed by the Wine Institute and the California Association of Winegrape Growers.

2.0 Project Objectives

The pilot project with the Wineries and Vineyards was conducted in order to meet the following objectives specified in AB 1102 (Stats. 1999, Ch. 65) codified in Public Resources Code, Section 71045 et seq.

Objective 1	Whether and how the use of an environmental management system (EMS) by a regulated entity
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increases public health and environmental protection over their current regulatory requirements¹; and

Objective 2 Whether and how the use of an EMS provides the public greater information on the nature and extent of public health and environmental effects than information provided by their current regulatory requirements².

To the above, the Cal/EPA added the following objectives:

Objective 3 Evaluate economic indicators to determine incentives and barriers to EMS implementation

Objective 4 Identify challenges and successful examples of EMS implementation

Further, each pilot participant had one or more additional pilot specific objectives. The pilot specific objective for the Wineries was to:

Objective 5 Evaluate the value of an EMS template

In the following sections, each objective will be paraphrased. For example, Objective 1 is referred to as simply environmental protection. The term environmental protection is intended to capture protection of both environmental and public health.

3.0 Project Methodology

Davis Bynum and Benziger have contributed data consistent with the requirements of the National Database and the California Protocols. Because these wineries are still in the process of implementing their EMSs and establishing baseline environmental performance indicator data, performance data is not available. Economic data is not available; therefore economic costs and benefits of EMS implementation cannot be analyzed.

¹ Protection provided by current regulatory requirements is defined as those protections provided through the issuance, enforcement, and monitoring of any permit, requirement, authorization, standard, certification, or other approval issued by a federal, state, regional or local agency to the regulated entity for the protection of the public health or the environment (PRC § 71046(a)(1)).

² Information provided by current regulatory requirements is defined as that information provided through the issuance, enforcement, and monitoring of any permit, requirement, authorization, standard, certification, or other approval issued by a federal, state, regional or local agency to the regulated entity for the protection of the public health or the environment, or any other law or regulation governing the disclosure of public information (PRC § 71046(a)(2)).

In addition to the protocols, participants conducted site tours of their facilities for the Cal/EPA team and Working Group members. Cal/EPA team members also met with pilot participant staff to elicit specific information about their facilities.

The analysis is accomplished by evaluating changes in environmental protection and in the provision of environmental information to the public as a result of EMS implementation at Davis Bynum and Benziger wineries.

3.1 Objective 1 Environmental Protection

To determine whether and how improved environmental protection resulted from EMS implementation, the following two primary categories of information were evaluated.

1. Awareness and commitment
2. Systematic management of environmental impacts
3. Environmental Performance Indicators

Awareness and Commitment refers to the scope of environmental issues to which the organization devotes its attention and identifies increased knowledge and understanding of environmental impacts, and recognition that action is necessary to lessen impacts and improve environmental protection. An analysis of a pilot's *awareness and commitment* will help answer both whether and how an EMS might provide better environmental protection.

Staff reviewed and analyzed the following measures of Awareness and Commitment:

1. The presence of an environmental policy which describes the organization's commitments and principles in regards to environmental protection.
2. Demonstrated knowledge and understanding of environmental laws, regulations, and other requirements.
3. Demonstrated knowledge and understanding of the environmental impacts of the organization.
4. Documentation of objectives and targets for environmental protection improvements.

Systematic management of environmental impacts refers to the ability of an organization to better protect the environment through a more mature and effective system of environmental management. Both whether and how an EMS might improve environmental protection is answered through an analysis of *systematic management of environmental impacts*.

Staff reviewed and analyzed the following measures of systematic management for environmental protection:

1. Documented implementation strategies and responsibilities designed to meet regulatory requirements, manage significant aspects, and achieve objectives and targets for improved environmental protection.
2. Measures to assess environmental performance.
3. Audit and review processes to assess the performance of the management system and make system adjustments in order to continually improve environmental performance and protection.

Environmental Performance Indicators

A method for evaluating the performance of key environmental indicators is described in the Methodology Section of the Legislative Report. Because post-EMS environmental performance data is not available, performance for key environmental indicators cannot be evaluated for this case study.

3.2 Objective 2 Environmental Information

Determining whether and how an EMS provides greater environmental information to the public is accomplished through analyzing two factors:

1. Public and stakeholder involvement in the EMS development, implementation, and review; and
2. Improvements in the accessibility and quality of environmental information available to the public as a result of EMS implementation.

The level of public and stakeholder involvement in EMS development, implementation and review not only indicates changes in communication, it also indicates the changing stakeholder role in improving environmental protection. Involvement provides avenues for stakeholder response to environmental information and feedback to the organization on their performance. This indicator of greater environmental information is measured by evaluating actual stakeholder participation in the pilot's EMS and processes in the EMS for outside communication. This information was collected through the National Database, California Protocol and through Cal/EPA Project Manager's observations.

Improvements in the accessibility and quality of environmental information were evaluated using the California Protocols. Improvements in compliance with legal reporting requirements and information sharing beyond legal requirements indicate improved communication to the public. Accessibility and quality (timeliness, relevance, completeness, and credibility) is evaluated to determine whether the EMS results in greater information available to the public.

3.3 Objective 3 Economic Incentives and Barriers to EMS Implementation

Economic data was not provided by this pilot; therefore, this analysis is not included in the case study report.

3.4 Objective 4 Successes and Challenges of EMS Implementation

Each pilot project offers unique experiences that provide lessons on the challenges inherent in the successful implementation of an EMS. These lessons help develop an understanding of the necessary or critical elements for successful EMS implementation. Challenges and successes were identified through the Cal/EPA and U.S. EPA Project Managers' observations, interviews with winery personnel and data analysis.

3.5 Objective 5 Develop a model EMS for vineyards and wineries that can be used by the wine industry in California

As the wineries built their EMS, Cal/EPA used this experience to develop the winery/vineyard EMS model. The Metal Finishing Environmental Management System Template created by US EPA as part of the Merit Partnership for Pollution Prevention and the National Metal Finishing Strategic Goals Program served as a model for the winery EMS. Artistic Plating, another Cal/EPA EMS Pilot, used this template in developing their EMS. Findings and conclusions are based on project manager observations and conversations with the wineries.

4.0 Discussion and Analysis

Where appropriate, the experience of Davis Bynum and Benziger wineries will be discussed separately followed by an analysis of both wineries.

4.1 Objective 1 Environmental Protection

Awareness and Commitment

Environmental Policy

Davis Bynum

Davis Bynum's Environmental Policy begins by expressing their goal to create a symbiotic, sustainable relationship between winery and vineyard that minimizes the negative impacts and increases positive impacts of their operations. A commitment to do the things necessary to meet this goal is expressed through the statement, "To this end we shall" followed by a bulleted list of activities. Each of these activities is a commitment and includes the ISO 14001 required commitments to compliance and prevention of pollution. Although the policy does not specifically express a commitment to continual improvement, many statements in the policy, including the goal statement and several bullets, imply this commitment.

The Environmental Policy defines the scope of the EMS to include both winery and vineyard operations and extends beyond regulated aspects to include

energy, natural resources, solid waste and organic farming. A commitment to reward customers and suppliers that adhere to similar environmental goals demonstrates a broadening of scope through their willingness to consider all aspects of their product's life cycle.

An extensive awareness of environmental issues and impacts is demonstrated by the Environmental Policy. Connecting vineyard and winery operations into a symbiotic and sustainable relationship displays an awareness of ecological design and systems thinking. The policy actually commits Davis Bynum to be aware of the significant impacts of their operations and all current environmental laws and regulations.

Hampton Bynum, Vice President, was directly involved in writing the Environmental Policy. This demonstrates commitment of management in the policy.

Benziger

The Environmental Policy of the Benziger Family Winery begins with a commitment to identifying and promoting the most environmentally safe and sustainable business and farming practices. The Benzigers tie this policy to increased product quality and the social well being of their employees and community. This introductory statement demonstrates an awareness of the relationship between environmental, economic and community quality.

The policy expresses commitments to continual improvement, prevention of pollution, and compliance as required by ISO 14001. A statement to comply fully with the letter and spirit of environmental laws and regulations implies that their commitment to compliance goes beyond simply meeting legal requirements.

The scope of their EMS as defined by the Environmental Policy extends beyond what they are legally required to manage. This broad scope is demonstrated by a commitment to integrate environmental considerations across all business functions (vineyard, winemaking, purchasing, etc.) and the inclusion of non regulated activities like recycling, environmentally preferred materials, natural resource management, and energy efficiency.

The breadth of environmental issues covered in the policy shows a well-developed awareness of environmental issues. Their policy also seeks to build awareness of employees by committing to educate employees to be environmentally responsible on the job and at home.

Analysis

Although Davis Bynum's and Benziger's Environmental Policies declare strong environmental commitments, their policies express already held values rather

than define a shift in the culture of their organizations. The policy does, however, establish a vision for future practices and a more complete integration of environmental practices into their business. As participants in the Bay Area Green Business Program, Davis Bynum and Benziger already established environmental policies through the Green Business Pledge, which states:

“We believe a successful business is dependent upon a healthy environment. We are actively working to show our environmental responsibility to our community by committing to the following objectives:

- To comply with all applicable environmental regulations and strive to exceed compliance,
- To conserve energy, water and other natural resources,
- To develop and implement practices that prevent pollution and waste, and
- To be an environmentally responsible business within our community.”

Their new EMS policies expand on the Green Business Pledge and more specifically expresses their commitments and goals. Although the pilot’s environmental values may not have changed, their Environmental Policies provide a means to clearly articulate these values to customers, suppliers, neighbors, government agencies and their employees.

Knowledge and Understanding of Legal Requirements

Both Benziger and Davis Bynum have developed compliance programs using compliance checklists provided by the Sonoma Green Business Program. Administered by the Sonoma County Department of Emergency Services, the Green Business Program provides compliance assistance and will certify that a winery is in compliance with all environmental laws and regulations. Environmental compliance for each of their winery operations were certified by the Green Business Program in 1999.

As part of the EMS planning process, Davis Bynum and Benziger catalogued environmental requirements for vineyards. This process did not uncover unknown and unmet requirements. Developing an EMS did not significantly improve understanding of legal requirements for the pilots. Previous participation in the Green Business Program helped them with their understanding.

Knowledge and Understanding of Environmental Impacts

An environmental aspect is an element of an organization’s activities, products, or services that can interact with the environment. The resulting effect of the aspect on the environment is its impact. Significant aspects and impacts are determined by the organization based on a self-established standard methodology. Management of all significant aspects is required by ISO 14001.

Significant aspects are therefore a good indicator of awareness and commitment. Significant aspects for Davis Bynum will first be discussed followed by Benziger. Table 1a lists all significant aspects and impacts for winery operations, while Table 1b lists vineyard significant aspects. Aspects are listed on the tables in order of significance with the most significant aspect listed first.

Davis Bynum

The majority of aspects identified by Davis Bynum relate to resource and material use. For example, electrical, water and fuel consumption were ranked as having the greatest significance. Materials used in wine making such as oak barrels, glass, corks, plastic, and Styrofoam also show high ranking. Use of these resources and materials are not regulated. Only one of the top thirteen significant aspects has regulated impacts. Outputs like solid waste disposal, air emissions, septic tank leaching, and surface water discharge were viewed as less significant. With the exception of solid waste disposal, all of these aspects are regulated. Other regulated aspects like compressed gas use, chemical use, fuel storage, and hazardous waste disposal were considered even less significant.

The list of aspects displays awareness of both the local impacts caused by winery operations and the off-site or indirect impacts from material or resource use. For example, impacts of electrical usage originate far from the winery and have regional or global effect. The impacts of many materials used in the winery are caused either in their production or disposal. Oak barrels, corks, glass, plastic, Styrofoam, and cardboard are examples. Aspects with local impacts like air emissions, water consumption, and surface water discharge are also included.

Benziger Family Winery

Although Benziger identified similar aspects as Davis Bynum there are some differences in the list as well as the ranking of significance for the aspects. One difference is the ranking of aspects with regulated impacts. Of the nine most significant aspects, only three do not have regulated impacts. These three are fuel, electricity, and water use and relate to resource consumption. Each of the remaining regulated aspects include hazardous material impacts, while three include water impacts, and two include air impacts.

Many aspects with non-regulated impacts are also included but were ranked as less significant. These aspects include material usage such as wood, glass, cork, paper, plastic, etc. The impacts from these aspects are most often indirect, in that they occur away from the winery, and result from production and disposal.

Analysis

The significant aspects from each winery indicate that they are concerned with both regulated and non-regulated aspects. Impacts from many of the aspects are either the result of the extraction of the natural resource, production of the material or its disposal. These impacts are primarily off-site, or indirectly related to the activities of the wineries. The wineries also identified some local and direct impacts like air emissions, water use (from wells), and surface water runoff. The many non-regulated aspects indicate an awareness of environmental issues beyond what is defined by legal requirements.

Each aspect list demonstrates a broad understanding of the impacts of their operations. Although the lists from Benziger and Bynum are similar, there are some differences. These may be due to differences in the size of their operations. These differences also demonstrate how aspect identification will vary between similar organizations even when using similar procedures.

Neither of the wineries had completed an analysis of their impacts previous to implementing an EMS. The Green Business Program includes some tools for assessing or auditing energy, water use and waste generation. While these tool focus on efficiency, they do not identify impacts. The process of identifying aspects and impacts increased awareness of environmental impacts at both wineries by comprehensively cataloguing both the direct and indirect impacts of their operations. By ranking the aspects, each winery can prioritize their efforts and more efficiently use their limited human and economic resources to minimize impacts. This type of prioritization was not used prior to EMS implementation.

Documentation of Objectives and Targets

Objectives and targets are listed on Table 2 and help demonstrate environmental commitments. After defining significant aspects, Davis Bynum and Benziger both realized that more information about many of the aspects was required before performance objectives and targets could be established for those aspects. As a result, the wineries set several objectives to simply collect information on particular aspects. These objectives either established measurement procedures and baseline data for resources used or they seek information on the impacts and alternatives of significant aspects.

Davis Bynum set objectives to define baseline metrics for energy, water, and propane use and installed water and electric meters at key locations. Benziger did the same for water. Davis Bynum set several objectives to conduct research on the impacts of some of the products they purchase like oak barrels and corks. They will also research alternatives to Styrofoam packing materials and look for recycling vendors for plastic shrink wrap and wood pallets. Benziger responded to the many material use aspects by pledging to develop a Preferred Purchasing Program by September 2002.

Another set of objectives would create operational controls, like Standard Operating Procedures (SOP), or environmental programs to safely manage significant aspects. Benziger set several objectives to establish SOPs by December 2002 for the management of propylene glycol and refrigerants, diatomaceous earth, and hazardous materials and waste handling. Similarly, Davis Bynum will establish SOPs by the end of 2002 for aspects such as solid waste handling and recycling, maintenance of equipment like lawn mowers and tractors, and paper use.

Performance objectives were also set by the wineries. Benziger set an objective to reduce overall electrical energy consumption by 20 percent for 2002, as compared to 2001. Davis Bynum set objectives to reduce use of water, electricity and propane by 10 percent in 2003, as compared to the 2002 baseline.

The majority of each winery's objectives addressed winery and not vineyard operations. This may be due to a few factors. First, both wineries have established environmentally responsible vineyard programs. Davis Bynum is certified organic by California Certified Organic Farmers (CCOF) and utilizes Permaculture ideas in vineyard design. Benziger practices what they call "natural farming methods" and is certified to the Demeter Biodynamic standard of agriculture. The requirements of CCOF and Demeter are identified in their EMSs as requirements that they must meet. Secondly, more aspects were identified for the winery as a result of more activities, resources used, and industrial processes of winery operations.

The objectives and targets set for Davis Bynum's vineyard reflects areas of potential improvement. Eight objectives were set for the vineyard and four of these have overlapping objectives with the winery. Overlapping objectives are electrical usage, water usage, air emissions from small engines, and fuel spills. Three of the four vineyard specific objectives establish Standard Operating Procedures and reflect a desire to become more formal in their management of certain aspects like air emissions from tractors and trucks, soil erosion, and sulfur application. One objective seeks to find alternatives to plastic ties used to direct the growth of vines.

Benziger, on the other hand, set no specific objectives for their vineyard except to establish baseline water use in 2002 followed by a specific target for reduction in 2003. Benziger felt that their current programs for managing significant vineyard aspects were adequate. These programs would be reviewed in 2002 to determine whether objectives are warranted to drive continual improvement. In regards to plastic ties, Benziger had already replace the plastic ties with hemp twine a few years ago.

The objectives and targets set by Davis Bynum and Benziger reflect the early stage of EMS development each organization is in. The process of creating objectives and targets made each winery aware of how many of their aspects

were either informally or under-managed. Their objectives demonstrate a desire by both wineries to become more aware and to better understand the impacts of their activities. Both wineries have also made commitments to improving the environmental performance of the resources they use. Although both wineries conducted environmental projects prior to EMS implementation, they had not previously established objectives based on a complete assessment and prioritization of their environmental impacts.

Systematic Management for Environmental Protection

This section describes the actions taken by the organization as they relate to the implementation and review phases of the organization's EMS and document how the organization protects the environment through its operations.

Implementation Strategies and Responsibilities

Because both Davis Bynum and Benziger wineries have only recently completed the planning phase of EMS development implementation is in the initial phases. Environmental Management Programs, or action plans, have been developed for each objective. These action plans identify the actions, resource needs, timelines and person(s) responsible for achieving the objective.

Measure to Assess Environmental Performance

Davis Bynum has completed the first actions of the programs for establishing water and electrical baselines. All water needs for the winery and vineyards are supplied by a well. Davis Bynum has installed several water meters in areas of the winery in order to measure water use for different winery operations and the vineyard. Although Davis Bynum received utility bills indicating electrical use, they have installed additional meters to monitor electrical use for specific winery operations. This data will establish baseline electrical and water use and help Davis Bynum target high water and energy using operations for conservation. They will now be able to measure specific improvements from conservation projects. Benziger already has electrical meters at key locations and may install water meters as well.

Audit and Review Processes for Continual Improvement

Both Davis Bynum and Benziger have established their EMS cycle to correspond to the calendar year. The calendar year also corresponds well to the cycle of winery operations. EMS audits and reviews will take place during late fall after harvest and crush and will be used to set the next year's objectives.

4.2 Objective 2 Environmental Information

Public and Stakeholder Involvement in the EMS Development, Implementation and Review

Cal/EPA established stakeholder Working Groups in both Southern and Northern California. Participation in one of those working groups was a requirement of inclusion in the pilot project. Working Groups were established to enlist stakeholder involvement and advice in meeting the objectives of the Cal/EPA pilot project as well as to provide a forum for stakeholder input into the pilot's EMS. Although pilot project participation with stakeholders through the Working Group was a project requirement, the experience of Davis Bynum and Benziger in this setting can provide information as to the willingness of parties to work together, as well as information about the value of that relationship.

Both wineries participated on the Northern California Working Group as well as a local Sonoma County Working Group. This additional working group was proposed to the wineries by Cal/EPA in order to gain personal and local involvement in the development and analysis of the wineries EMSs. The long distance and travel time to the San Francisco meeting place of the Northern California Working Group was another factor. The Sonoma County Working Group included members from local watershed councils, county environmental agencies, businesses, other wineries, and the Sonoma County Grape Growers Association. The Sonoma County Working Group met six times between November 2000 and August 2001. Meeting agendas focused on the Benziger and Bynum's developing EMSs and included working sessions to help educate members about EMSs in general and elicit their feedback on the specific elements of the wineries' EMS.

Benziger hosted an onsite Northern California Working Group meeting and facility tour on November 14, 2000, while Davis Bynum hosted a similar meeting on April 25, 2001. Participants from both the Northern California and Sonoma County Working Groups attended these meetings. During the onsite meetings and regular meetings of the Sonoma County Working Group, Davis Bynum and Benziger shared draft Environmental Policies, aspect and impact analysis, and objectives and targets. The meeting agendas encouraged stakeholder input into the wineries developing EMS.

Davis Bynum and Benziger both willingly shared environmental information generated through their EMSs with stakeholders and encouraged their input. Prior to EMS implementation, the wineries were not involved in any organized community involvement processes. Each winery, however, regularly host organizations and individuals interested in their environmental programs.

Public Accessibility and Quality of Environmental Information

Davis Bynum and Benziger wineries share similar information with the public. As mentioned above, environmental information generated by their EMSs has been

shared with the Northern California and Sonoma County Working Groups. They are required to share environmental information such as hazardous waste generation, surface water discharge quality, and pesticide use with public agencies. This type of information is available to the general public upon request. Proposition 65 notices for alcohol are posted in their tasting rooms.

Both wineries have web sites and include information on their environmental farming practices. The Benziger web site discusses their use of natural farming methods to produce world class wines. Sustainability, community involvement, and Permaculture are discussed on the Davis Bynum web site.

Information sharing practices at both wineries has not dramatically changed as a result of EMS implementation. These wineries have had a tradition of community involvement and openness. Each winery has areas for hosting groups and their web sites discuss environmental issues. Tours at the Benziger winery emphasize environmental practices. Benziger and Bynum's EMSs will, in the future, generate environmental performance data that may be of public interest. Each winery has indicated that they intend to continue to be transparent with their environmental information.

4.3 Objective 3 Economic Incentives and Barriers to EMS Implementation

Economic indicators were not available from the pilot project; therefore, an analysis of economic costs and benefits of EMS implementation is not included.

4.4 Objective 4 Successes and Challenges of EMS Implementation

Both Davis Bynum Winery and Benziger Winery have committed to completing their EMS and have actively participated in the Cal/EPA EMS project. Matt Atkinson from Benziger and Hampton Bynum and Richard Wights from Davis Bynum have given countless hours to the project. Mike and Chris Benziger have also thoroughly supported the project. Without this support and commitment, the project could not have continued and although their EMSs are not fully implemented they have clearly expressed their intention to press on and complete their EMSs. Once completed, it is Cal/EPA's understanding that these will be the first ISO 14001-based winery and vineyard EMSs in the United States.

The great amount of time necessary to develop and implement an EMS has been a challenge to both companies. Davis Bynum is a small winery with little resources to devote to EMS development. Benziger is a medium sized winery and was also challenged by the amount of time required to develop an EMS. The wineries were not able to involve more than a few people on the EMS development team. Broader inclusion of winery functions would provide more balance and greater employee buy-in to the EMS.

EMS development provided many technical challenges. The aspect and impact element of the EMS was especially challenging and time consuming. Although Cal/EPA provided technical support, no one on the team had experience with EMSs. EMS development was a 'learn by doing' exercise.

EMS models, examples and templates were useful resources. The Australian Agricultural EMS template and the US EPA Merit Partnership Metal Finishing template were used extensively for this project. Also, training classes provided by Cal/EPA to the Working Groups and pilot project greatly helped the team develop the EMSs.

Local stakeholders were involved in the winery EMS project through the Sonoma County Working Group. The working group was successful in providing input into the wineries EMS. Through the Sonoma County Working Group, stakeholders became educated about the potential environmental benefits and challenges of EMS implementation.

4.5 Objective 5 Develop a model EMS for vineyards and wineries that can be used by the wine industry in California

The Winery/Vineyard EMS Template is nearly complete. The Metal Finishing EMS Template produced by US EPA for the Merit Partnership was used extensively in creating the Winery/Vineyard Template. Both the metal finishing and winery/vineyard templates are based on the ISO 14001 EMS standard and direct an organization to complete most of the elements required by the ISO standard. The Winery/Vineyard EMS Template differs from the Metal Finishing template in several ways including the following additions or modifications:

- An environmental assessment element that includes an ISO 14001 Gap Analysis and materials to help collect environmental information of winery and vineyard operations.
- A customized aspect and impact register for both winery and vineyard operations.
- Modified tables, forms, and text that apply to wineries or vineyards.
- An element on Operational Controls and information to assist in developing Standard Operating Procedures.
- Closer adherence to the ISO 14001 Standard.

Other resources were consulted in the creation of the Winery/Vineyard EMS template. These include the "EMS Agricultural Manual" produced by the Wollongbar Agricultural Institute in New South Wales Australia, The "Lodi Winegrower's Workbook: A Self-Assessment of Integrated Farming Practices" (Lodi-Woodbridge Winegrape Commission), and "Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations" (NSF International and US EPA).

Because much of the material in the Metal Finishing Template is generic to all EMSs, it served as a useful tool and foundation for the development of the Winery/Vineyard Template. Future industry specific EMS templates may also benefit from this earlier work and the additions included in the Winery/Vineyard Template. With hope as EMSs are implemented using both these tools the quality and usefulness of these and future templates will improve.

The experience in concurrently developing a template and implementing an EMS based on that template has provided several lessons and raised some questions. The following paragraphs will address these.

The Winery/Vineyard EMS Template appears to be extremely useful. Because of the significant time commitment necessary for EMS development, an EMS template can be extremely valuable especially to small and medium sized wineries. Each winery has stated that without assistance they would not have been able to implement an EMS without great expense. A template may go a long way in providing that assistance.

Templates can provide industry specific information and guidance on EMS elements that may have commonalities within an industry. For example, aspect and impact identification can be a challenging and time consuming effort. Several months were spent developing the aspect/impact register template. The register template was written to apply to the industry in general and not the individual wineries involved in the pilot. The template was then used by the wineries to identify their own aspects. Subsequent wineries and vineyards should be able to complete their aspect analysis in a period of days instead of several months.

A winery/vineyard EMS template may complement other environmental programs for vineyards and wineries. Except for the aspect identification portion of the template, the technical specifics of proper environmental management are not part of the template. For example, the template may help direct the winery to develop an erosion control plan; however, the specific best practices for reducing erosion are not provided. Programs like the Sonoma Green Business Program, Fish Friendly Farming, and the Code of Sustainable Winegrowing Practice Guide provide best management practices that could be incorporated and implemented through an EMS. The EMS template provides the framework for the management structure and systems approach to environmental management; however, it does not and probably should not provide the actual programs or practices to achieve the environmental objectives of the winery. The EMS template is designed with ISO 14001 requirements in mind and therefore provides a route to third-party audits and ISO.

Even with the assistance of a template, EMS implementation will likely continue to be a technical challenge and require significant human and economic resources.

5.0 Findings

5.1 Objective 1 Environmental Protection

- Although Davis Bynum's and Benziger's Environmental Policies declare strong environmental commitments, their policies express already held values rather than define a shift in the culture of their organizations. They had already accepted the already written Sonoma Green Business Pledge. Their new Environmental Policies are their own creations and more specifically express visions for future practices and a more complete integration of environmental values into their business operations. Further, the Environmental Policies provide a clear expression of company values and commitments to customers, suppliers, neighbors, government agencies and employees.
- Developing an EMS did not significantly improve understanding of legal requirements for the pilots. Previous participation in the Green Business Program helped them with their understanding and demonstrated compliance in their winery operations. As part of the EMS planning process, Davis Bynum and Benziger additionally catalogued environmental requirements for vineyards. This process did not uncover unknown and unmet requirements.
- Neither of the wineries had completed an analysis of their impacts prior to implementing an EMS. The Green Business Program includes some tools for assessing or auditing energy, water use and waste generation. While these tools focus on efficiency, they do not identify impacts. The process of identifying aspects and impacts increased awareness of environmental impacts at both wineries by comprehensively cataloguing both the direct and indirect impacts of their operations. By ranking the aspects, each winery can prioritize their efforts and more efficiently use their limited human and economic resources to minimize impacts. This type of prioritization was not used prior to EMS implementation.
- The objectives and targets set by Davis Bynum and Benziger reflect the early stage of EMS development each organization is in. The process of creating objectives and targets made each winery aware of how many of their aspects were either informally or under-managed. As a result several objectives seek to establish Standard Operating Procedures to better manage aspects. Their objectives demonstrate a desire by both wineries to become more aware and to better understand the impacts of their activities. Both wineries have also made commitments to improving the environmental performance of the resources they use. Although both wineries conducted environmental projects prior to EMS implementation, they had not previously established objectives based on a complete assessment and prioritization of their environmental impacts.

- The majority of each winery's objectives addressed winery and not vineyard operations. This may be due to a few factors. First, both wineries have established environmentally responsible vineyard programs. Secondly, more aspects were identified for the winery as a result of more activities, resources used, and industrial processes of winery operations.
- Because both Davis Bynum and Benziger wineries have only recently completed the planning phase of EMS development, they have only begun implementation. Environmental Management Programs, or action plans, have been developed for each objective. These action plans identify the actions, resource needs, timelines and person(s) responsible for achieving each objective. Neither winery had conducted this type of planning prior to EMS development.
- As a result of EMS implementation both wineries are measuring their use of some resources. Davis Bynum has installed water and electrical meters to better understand their consumption of these resources. Prior to EMS implementation, Davis Bynum was unaware of how much water was used at their winery and vineyard. While this information was available to Benziger, they did not monitor the data to measure environmental performance.

5.2 Objective 2 Environmental Information

- Davis Bynum and Benziger willingly shared environmental information generated through their EMSs with stakeholders and encouraged their input. They especially worked closely with local stakeholders through the Sonoma County Working Group. Prior to EMS implementation, the wineries were not involved in any organized community involvement processes. Each winery, however, has and continues to regularly host organizations and individuals interested in their environmental programs.
- Information sharing practices at both wineries have not dramatically changed as a result of EMS implementation. These wineries have had a tradition of community involvement and openness. Some environmental information is included in their web sites. The EMSs have the potential to create environmental performance data that may be of public interest. Each winery has indicated that they intend to continue to be transparent with their environmental information.

5.3 Objective 3 Economic Incentives and Barriers to EMS Implementation

Because no information is available, there are no findings.

5.4 Objective 4 Successes and Challenges of EMS Implementation

- An already established culture of environmental stewardship has helped maintain Davis Bynum and Benziger's motivation and commitment to completing their EMSs even with challenges such as limited resources and competing priorities.
- The small size of these companies and the technical challenges of EMS implementation have made completing their EMSs in a timely manner difficult. They began EMS development in the summer of 2000 and have only completed the design phase of the EMS. Their small size and the cyclical nature of the wine business have contributed to the challenge of completing their EMS. Little work was accomplished during the two to three month harvest season or "crush" due to the need to direct all available personnel during this critical time. Also, because of economic reasons the wineries were not able to involve more than a few people on the EMS development team. This left the responsibility of EMS development on a few individuals.
- EMS development teams were small. Broader inclusion of winery personnel would provide more balance, better information as to processes and impacts, and greater employee buy-in to the EMS.
- EMS development provided many technical challenges. The aspect and impact element of the EMS was especially challenging and time consuming. Although Cal/EPA provided technical support, no one on the team had experience with EMSs. EMS development was a 'learn by doing' exercise.
- EMS models, examples and templates were useful resources. The Australian Agricultural EMS template and the US EPA Metal Finishing template were used extensively for this project. Also, training classes provided by Cal/EPA to the working groups and pilot project greatly helped the team develop the EMSs.
- Local stakeholders were involved in the Winery EMS Project through the Sonoma County Working Group. The Working Group was successful in providing input into the wineries' EMSs. Through the Working Group stakeholders, including other wineries, consultants, government agencies and a community activist became educated about the potential environmental benefits and challenges of EMS implementation.

5.5 Objective 5 Develop a model EMS for vineyards and wineries that can be used by the wine industry in California

- The Winery/Vineyard EMS template is nearly complete. The Metal Finishing template produced by US EPA for the Merit Partnership has been a very useful model.

- Because of the significant time commitment necessary for EMS development, an EMS template can be extremely valuable especially to small and medium-sized wineries. Providing templates for industry sectors may be a useful role for government.
- A winery/vineyard EMS template may complement other environmental programs designed for vineyards and wineries. An EMS template can provide the management structure and systems approach to environmental management while other programs such as the Sonoma Green Business Program, Fish Friendly Farming, and the Sustainable Winegrape Growing Practice Guide provide the technical specifics for EMS implementation, such as best management practices.

6.0 Conclusions of the Winery Pilot Project

EMS development at both wineries has resulted in greater awareness of their environmental impacts and greater commitment to improve environmental performance. Although both Davis Bynum and Benziger wineries had already established cultures of environmental stewardship, the EMS helped them become more aware of the full extent of their impacts and areas where environmental protection improvements could occur. Both wineries discovered that many impacts were unknown or either informally or under managed. Through the Environmental Policy and objective setting process, the wineries have established new commitments to increase environmental protection through a process of continual improvement.

Davis Bynum and Benziger willingly shared information and welcomed feedback on their developing EMS from stakeholders participating in the Northern California and Sonoma County Working Groups. The wineries have a history of community engagement, including working with neighbors, hosting visitors and giving tours. The EMS project added an additional avenue for stakeholder engagement into the environmental practices of the wineries.

While the winery EMS did not result in greater environmental information to the general public, it did generate more information about the environmental commitments and impacts of the wineries and this information was shared with the Northern California and Sonoma County Working Groups. Both wineries make this information available to the public upon request. Some environmental information is available on each winery's web site.

An already established culture of environmental stewardship has helped maintain Davis Bynum and Benziger's motivation and commitment to completing their EMSs even with challenges such as limited resources and competing priorities. The wineries view the EMS as a logical next step in developing their environmental programs. They hope to become more knowledgeable about their

impacts, more strategic in their planning, and more systematic in their organization.

Developing and implementing an EMS is extremely time consuming and difficult for small and medium-sized wineries. Davis Bynum and Benziger's EMSs are not fully implemented after two years due to difficulty of EMS implementation, only a few individuals being devoted to the task, and the nature of the winery business. An EMS template for wineries and vineyards would greatly assist wineries wishing to implement EMS. Government may play an important role by helping to provide EMS templates to help small and medium-sized business, and in particular industry sectors. Partnerships with industry associations and other stakeholders are an important component of EMS template development.

EMSs are applicable to both wineries and vineyards. The systematic structure of an EMS (identifying impacts, setting objectives, measuring and reviewing performance, and making corrections or setting new objectives) is relevant for both the agricultural and industrial activities of wineries. However, neither the ISO 14001 Standard, nor the EMS template contains the specific technical practices and programs necessary to improve environmental protection. These specifics must either be developed independently by the wineries or with the help of other supportive programs like Fish Friendly Farming, Sonoma Green Business Program, or the Code of Sustainable Winegrape Growing Practices.

Davis Bynum Winery

Table 1a. Significant Aspects and Impacts for Davis Bynum Winery Operations¹

Aspect	Regulated Impacts				Non-Regulated Impacts					
	Air	Water	Haz. Material or Waste	Other	Air	Water	Solid Waste	Energy	Material/ Resource Input	Other
Electrical usage					X			X		
Water consumption						X				
Propane consumption					X				X	extracti on
Oak Barrels									X	
Chemical usage			X	X						
Glass bottles							X		X	
Corks									X	forests
Plastic shrink wrap							X		X	
Wood pallets							X		X	forests
Styrofoam use in shipping					X		X		X	
Pesticides and fertilizers (lawns and gardens)					X	X			X	
Solid Waste Disposal						X	X			

¹ Data sources: University of North Carolina National Database Report, EMS Design Table 2: Activities, Aspects and Impacts; and Design Update Section 4.

Table 1a. Significant Aspects and Impacts for Davis Bynum Winery Operations¹ (continued)

Aspect	Regulated Impacts				Non-Regulated Impacts					
	Air	Water	Haz. Material or Waste	Other	Air	Water	Solid Waste	Energy	Material/ Resource Input	Other
Air Emissions (small engines)					X					
Leaching from septic tanks						X				
Surface water to river						X				
Compressed gas					X				X	
Cardboard							X		X	
Paper							X		X	
Paint					X	X				
Fuel consumption					X					
Metal foil							X		X	
Citric Acid						X				
Soda ash usage						X			X	
Ozone usage				X	X					
Disposal of Electronic equipment			X				X			

¹ Data sources: University of North Carolina National Database Report, EMS Design Table 2: Activities, Aspects and Impacts; and Design Update Section 4.

Table 1a. Significant Aspects and Impacts for Davis Bynum Winery Operations¹ (continued)

Aspect	Regulated Impacts				Non-Regulated Impacts					
	Air	Water	Haz. Material or Waste	Other	Air	Water	Solid Waste	Energy	Material/ Resource Input	Other
Soap and detergents						X				
Fuel and oil storage			X			X				
Chemical containers			X							
Florescent lights and mercury ballast			X							
Metal recycling							X			
Plastic recycling							X			

¹ Data sources: University of North Carolina National Database Report, EMS Design Table 2: Activities, Aspects and Impacts; and Design Update Section 4.

Table 1b. Significant Aspects and Impacts for Davis Bynum Vineyard Operations¹ (continued)

Aspect	Regulated Impacts				Non-Regulated Impacts					
	Air	Water	Haz. Material or Waste	Other	Air	Water	Solid Waste	Energy	Material/Resource Input	Other
Electrical usage from water pumping					X			X		
Water consumption						X				
Fuel for tractors/trucks					X				X	extracti on
Storm Water/soil erosion		X				X				
Off road driving (soil compaction)						X				
Plastic ties on vines							X			
Solid waste							X			
Sulfur usage					X					
Wild life corridors/fencing										habitat

¹ Data sources: University of North Carolina National Database Report, EMS Design Table 2: Activities, Aspects and Impacts; and Design Update Section 4.

Table 2. Objectives and Targets for Davis Bynum Winery and Vineyard Operations²

Objective	Target	Status	Regulated		Non-Regulated
			Meets	Beyond	
Reduce energy use: establish 1 year energy use baseline, reduce consumption by 10 percent (Winery/Vineyard = W/V)	Baseline for 2002; 10 percent for 2003	Installed meters, collecting data			X
Reduce water use: establish 1 year water use baseline, reduce consumption by 10 percent (W/V)	Baseline for 2002; 10 percent for 2003	Installed meters, collecting data			X
Reduce propane use: audit propane use, evaluate conservation technologies (Winery = W)		Not yet implemented			X
Ensure sustainably harvested oak for barrels: research source of oak for barrels, determine if sustainably harvested (W)		Not yet implemented			X
Reduce or eliminate chemical spills and leaks: establish Standard Operating Procedures (SOP) for chemical usage (W)		Not yet implemented		X	
Maximize recycling: develop 'formal' recycling program for Solid Waste: glass, paper, plastic shrink wrap, metal, cardboard, wood pallet, electric equipment (W)		Not yet implemented			X
Buy "green" products: develop Environmentally Preferred Purchasing Program (paints, soaps, paper, electronic equipment, lighting, etc.) (W)		Not yet implemented			X
Organic landscape: determine pesticide, fertilizer and herbicide usage on lawns and garden, establish formal organic gardening policy (W)		Not yet implemented			X

² Data sources: University of North Carolina National Database Report, EMS Design Table 5: Planned Dates of Objectives and Targets; and Design Update Section 6.

Table 2. Objectives and Targets for Davis Bynum Winery and Vineyard Operations²

Objective	Target	Status	Regulated		Non-Regulated
			Meets	Beyond	
Reduce Air Emissions from small engines: establish SOP for regular maintenance. (W/V)		Not yet implemented			X
Protect surface and groundwater from septic and leach fields: establish SOP for maintenance and monitoring. (W)		Not yet implemented		X	
Protect surface water from runoff: control non-point pollution sources, comply with monitoring. (W)		Not yet implemented	X		
Control Citric acid usage: research impacts and establish SOP for handling (W)		Not yet implemented			X
Control Soda ash usage: research impacts and establish SOP for handling (W)		Not yet implemented			X
Control Ozone Usage: research impacts and establish SOP for handling (W)		Not yet implemented			X
Reduce or eliminate fuel spills: establish SOP for storage. (W/V)		Not yet implemented		X	
Reuse or recycle chemical containers: establish SOP (W)		Not yet implemented			X
Ensure proper disposal of Florescent lights and mercury ballast: establish SOP (W)		Not yet implemented	X		
Reduce Soil Erosion in vineyards: establish erosion control program (vineyard = V)		Not yet implemented		X	
Reduce fuel consumption and air emissions from trucks and tractors: establish SOP for regular maintenance (V)		Not yet implemented			X
Find alternatives for plastic ties: research alternatives (V)		Not yet implemented			X
Reduce sulfur usage: establish SOP for application and equipment maintenance (V)		Not yet implemented		X	

² Data sources: University of North Carolina National Database Report, EMS Design Table 5: Planned Dates of Objectives and Targets; and Design Update Section 6.

Tables 3, 4 and 5 are not included because there are no post EMS data to support them.

Table 6. Environmental Information Type and Availability to Public for Davis Bynum Winery⁶

Information Subject	Legal Reporting Requirement		Location of Public Information					
	Yes	No	Web site	Public Relations Dept.	Newsletter	Annual Report	Environmental Agency	Other
EMS Policy		X						Local Stakeholder group
EMS Env. Aspects		X						Local Stakeholder group
EMS Env. Impacts		X						Local Stakeholder group
EMS Objectives and Targets		X						Local Stakeholder group
Operation and Procedures								
Compliance information	X						X	Upon request
Hazardous waste generation							X	Upon request
Air emissions							X	Upon request
Water discharge	X						X	Upon request
Resource use: energy		X						Upon request

Note: For Legal Reporting Requirement, mark NA if not applicable.

⁶ Data Sources: California Supplemental Protocols

Table 6. Environmental Information Type and Availability to Public for Davis Bynum Winery⁶ (continued)

Information Subject	Legal Reporting Requirement		Location of Public Information					
	Yes	No	Web site	Public Relations Dept.	Newsletter	Annual Report	Environmental Agency	Other
Resource use: water		X						Upon request
Resource use: materials		X						Upon request
Solid Waste		X						Upon request
TRI								
Community Right to Know Prop. 65								
Other: pesticide application (sulfur)	x						X	Upon request

Note: For Legal Reporting Requirement, mark NA if not applicable.

⁶ Data Sources: California Supplemental Protocols

Benziger Family Winery

Table 1a. Significant Aspects and Impacts for Benziger Winery Operations¹

Aspect	Regulated Impacts				Non-Regulated Impacts					
	Air	Water	Haz. Material or Waste	Other	Air	Water	Solid Waste	Energy	Material/Resource Input	Other
Fuel consumption					X				X	Extraction
Spillage hazard materials		X	X		X					
Use of refrigerants	X			Ozone depleter						
Use of diatomaceous earth			X				X			
Mercury containing lights and ballasts		X	X							
Use of paint			X		X	X	X			
Haz. Waste Disposal	X	X	X							
Use of Water						X				
Use of Electricity					X			X	X	
Use of sulfur gas					X					
Use of wood							X		X	Forests
Use of glass							X		X	
Use of corks							X		X	Forests

¹ Data sources: University of North Carolina National Database Report, EMS Design Table 2: Activities, Aspects and Impacts; and Design Update Section 4.

Table 1a. Significant Aspects and Impacts for Benziger Winery Operations¹ (continued)

Aspect	Regulated Impacts				Non-Regulated Impacts					
	Air	Water	Haz. Material or Waste	Other	Air	Water	Solid Waste	Energy	Material/Resource Input	Other
Use of paper						X	X		X	Forests
Use of cardboard						X	X		X	Forests
Use of metal and plastic foil							X		X	
Use of plastic					X		X		X	
Use of Styrofoam					X		X		X	ODC
Solid waste disposal						X	X			
Noise										Peace and quiet
Propylene glycol			X							
CO2 emission	X			Green house gas						
Use of glues					X					
Waste elect. Equipment			X				X			

¹ Data sources: University of North Carolina National Database Report, EMS Design Table 2: Activities, Aspects and Impacts; and Design Update Section 4.

Table 1b. Significant Aspects and Impacts for Benziger Vineyard Operations¹

Aspect	Regulated Impacts				Non-Regulated Impacts					
	Air	Water	Haz. Material or Waste	Other	Air	Water	Solid Waste	Energy	Material/ Resource Input	Other
Storm water/erosion		X								Soil loss
Spillage/leakage hazardous materials and solid waste			X	Soil		X	X			soil
Fuel consumption					X				X	extraction
Use of electricity					X			X	X	
Removing water from aquifer						X			X	Aquifer depletion
Use of water						X				Habitat
Use of sulfur			X		X	X			X	
Fuel air emissions						X				
Use of plastic					X		X		X	
Fences and barriers										Habitat
Noise										Peace and quiet
Solid waste disposal						X	X			

¹ Data sources: University of North Carolina National Database Report, EMS Design Table 2: Activities, Aspects and Impacts; and Design Update Section 4.

Table 2. Objectives and Targets for Benziger Winery and Vineyard Operations²

Objective	Target	Status	Regulated		Non-Regulated
			Meets	Beyond	
1. Reduce electrical consumption by 20 percent	20 percent by 12/02	In process			X
2. Monitor water use to establish 2002 baseline, set performance target in 2003	By 12/02	In process			X
3. Minimize dependency on non-renewable electrical energy sources by generating 5 percent of needs	Generate 5% of energy needs by 12/02	In process			X
4. Write Standard Operating Procedure for safe handling and disposal of hazardous materials	By 09/02	In process			X
5. Write SOP for safe handling and disposal of diatomaceous earth	By 12/02	In process			X
6. Develop Environmentally Preferred Purchasing policy and program for more efficient use of resources.	By 07/02	In process			X
7. Write SOP for refrigerant handling to prevent accidental discharge	By 12/02	In process			x

² Data sources: University of North Carolina National Database Report, EMS Design Table 5: Planned Dates of Objectives and Targets; and Design Update Section 6.

Tables 3, 4, and 5 are not included because there are no post EMS data to support them.

Table 6. Environmental Information Type and Availability to Public for Benziger Family Winery⁶

Information Subject	Legal Reporting Requirement		Location of Public Information					
	Yes	No	Web site	Public Relations Dept.	Newsletter	Annual Report	Environmental Agency	Other
EMS Policy		X						Local Stakeholder group
EMS Env. Aspects		X						Local Stakeholder group
EMS Env. Impacts		X						Local Stakeholder group
EMS Objectives and Targets		X						Local Stakeholder group
Operation and Procedures								
Compliance information	X						X	Upon request
Hazardous waste generation							X	Upon request
Air emissions							X	Upon request
Water discharge	X						X	Upon request
Resource use: energy		X						Upon request

Note: For Legal Reporting Requirement, mark NA if not applicable.

⁶ Data Sources: California Supplemental Protocols

Table 6. Environmental Information Type and Availability to Public for Benziger Family Winery⁶ (continued)

Information Subject	Legal Reporting Requirement		Location of Public Information					
	Yes	No	Web site	Public Relations Dept.	Newsletter	Annual Report	Environmental Agency	Other
Resource use: water		X						Upon request
Resource use: materials		X						Upon request
Solid Waste		X						Upon request
TRI								
Community Right to Know Prop. 65								
Other: pesticide application (sulfur)	x						X	Upon request

Note: For Legal Reporting Requirement, mark NA if not applicable.

⁶ Data Sources: California Supplemental Protocols